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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/083,991	02/26/2002	Chia-Der Chang	TS01-660	5768

28112 7590 11/07/2003

GEORGE O. SAILE & ASSOCIATES  
28 DAVIS AVENUE  
POUGHKEEPSIE, NY 12603

EXAMINER
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ISAAC, STANETTA D

ART UNIT	PAPER NUMBER
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2812

DATE MAILED: 11/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/083,991

Applicant(s)

CHANG ET AL.

Examiner

Stanetta D. Isaac

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 26 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Pri ority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Response to Amendment*

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

### *Response to Arguments*

2. Applicant's arguments with respect to claims 1-19 have been considered but are moot in view of the new ground(s) of rejection.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stanley Wolf Vol. II in view of Lin US Patent 6,524,950 in view of Detzel et al. US Patent 6,287,174.

5. Pertaining to claims 1 and 11, Wolf discloses the semiconductor method substantially as claimed. See **FIG. 2-31** where Wolf teaches a method of planarizing substrates having shallow trench isolation, comprising:

providing a substrate (a);

forming trenches in said substrate (a);

depositing a layer of dielectric (b) on said substrate thereby filling said trenches with said dielectric;

forming a layer of resist (c) on said layer of dielectric;

removing all of said layer of resist and part of said layer of dielectric thereby leaving said trenches filled with trench dielectric and forming a planar surface (d).

However, Wolf fails the step of using said polishing pad and chemical mechanical polishing.

See **FIGS. 2A- 2B** where Lin teaches the step of using said polishing pad and chemical mechanical polishing. In view of Lin it would have been obvious to one of ordinary skill in the art to incorporate Lin into Wolf because 208 is a photoresist layer that is removed by a CMP procedure. (See **col. 3 lines 42-53**)

In addition, Wolf and Lin both fail providing a polishing pad having a hardness of at least Shore "D" 52. See **col. 4 lines 14-22** where Detzel teaches providing a polishing pad having a hardness of at least Shore "D" 52. In view of Detzel it would have been obvious to one of ordinary skill in the art to incorporate Detzel into Wolf and Lin because a polishing pad can have a shore D hardness of 25-80 and given the teachings of the references, it would have been obvious to determine the optimum thickness, temperature as well as condition of delivery of the layers involved. *See In re Aller, Lancey and Hall* (10 USPQ 233-237) "It is not inventive to discover optimum or workable ranges by routine experimentation. Note that the specification contains no disclosure of either the critical nature of the claimed ranges or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. *In re Woodruff*, 919 f.2d 1575,1578,16 USPQ2d 1934, 1934 (Fed. Cir. 1990).

Any differences in the claimed invention and the prior art may be expected to result in some differences in properties. The issue is whether the properties differ to such an extent that

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the difference is really unexpected. *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986)

Appellants have the burden of explaining the data in any declaration they proffer as evidence of non-obviousness. *Ex parte Ishizaka*, 24 USPQ2d 1621, 1624 (Bd. Pat. App. & Inter. 1992).

An Affidavit or declaration under 37 CFR 1.132 must compare the claimed subject matter with the closest prior art to be effective to rebut a prima facie case of obviousness. *In re Burckel*, 592 F.2d 1175, 201 USPQ 67 (CCPA 1979).

6. Pertaining claim 2, Wolf teaches the method of claim 1 wherein said substrate is a silicon wafer having devices formed therein.
7. Pertaining to claim 3, Wolf teaches the method of claim 1 wherein said dielectric is silicon dioxide deposited using high density plasma chemical vapor deposition.
8. Pertaining to claim 4, Wolf teaches the method of claim 1 wherein said trenches are shallow trench isolation trenches.
9. Pertaining to claim 5, Wolf teaches the method of claim 1 wherein said layer of resist is formed by spinning resist on said substrate followed by baking said resist.
10. Pertaining to claim 6, Wolf teaches the method of claim 1 wherein said resist. is photoresist.
11. Pertaining to claim 7, Wolf teaches the method of claim 6 wherein said photoresist is formed by spinning said photoresist on said substrate followed by baking said photoresist.

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12. Pertaining to claim 8, Wolf teaches the method of claim 1 wherein said removing said layer of resist and part of said layer of dielectric removes that part of said layer of dielectric above said substrate.
13. Pertaining to claims 9, Wolf teaches the method of claim 1 further comprising:
  - forming a layer of pad oxide on said substrate before said
  - forming trenches in said substrate;
  - forming a layer of silicon nitride on said layer of pad oxide before said forming trenches in said substrate; and
  - forming trench openings in said layer of pad oxide and said layer of silicon nitride before said forming trenches in said substrate.
14. Pertaining to claim 10, Wolf teaches the method of claim 9 wherein said removing said layer of resist and part of said layer of dielectric removes that part of said layer of dielectric above said layer of silicon nitride.
15. Pertaining to claim 12, Wolf teaches the method of claim 11 wherein said substrate is a silicon substrate having devices formed therein.
16. Pertaining to claim 13, Wolf teaches the method of claim 11 wherein said trench dielectric is silicon dioxide deposited using high density plasma chemical vapor deposition.
17. Pertaining to claim 14, Wolf teaches the method of claim 11 wherein said dielectric base comprises a layer of pad oxide formed on said substrate and a layer of silicon nitride on said layer of pad oxide.

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18. Pertaining to claim 15, Wolf teaches the method of claim 14 wherein said removing said layer of resist and part of said layer of dielectric removes that part of said layer of dielectric above said layer of silicon nitride.

19. Pertaining to claim 16, Wolf teaches the method of claim 11 wherein said layer of resist is formed by spinning resist on said substrate followed by baking said resist.

20. Pertaining to claim 17, Wolf teaches the method of claim 11 wherein said resist is photoresist.

21. Pertaining to claim 18, Wolf teaches the method of claim 16 wherein said photoresist is formed by spinning said photoresist on said substrate followed by baking said photoresist.

22. Pertaining to claim 19, Wolf teaches the method of claim 11 wherein said removing said layer of resist and part of said layer of dielectric removes that part of said layer of dielectric above said dielectric base.

23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stanetta D. Isaac whose telephone number is 703-308-5871. The examiner can normally be reached on Monday-Friday 7:30am -5:30pm.

24. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Nebling can be reached on 703-308-3325. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722.

25. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Stanetta Isaac


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Patent Examiner

November 5, 2003



John F. Niebling  
Supervisory Patent Examiner  
Technology Center 2800